

ADDENDUM No. 1
RFP #04-01
PRECISION TOPOGRAPHIC AND BATHYMETRIC MAPPING OF PORTIONS
OF THE YELLOWSTONE RIVER CHANNEL AND FLOODPLAIN, PHASE I.

To All Offerors:

Please make the following modifications to the above-referenced "Request for Proposal"

The questions and the District's answers to each question, become an official amendment to the RFP.

All other terms of the Request for Proposal are to remain as previously stated.

Acknowledgement of Addendum

The offeror for this RFP must acknowledge receipt of this addendum. This page must be submitted with the offeror's response to this RFP or the offeror may be disqualified from further consideration.

I acknowledge receipt of Addendum #1.

Signed: _____

Company Name: _____

Date: _____

QUESTIONS AND RESPONSES

Q1: Please provide information on approximate depths to be encountered and extent of deeper pools (12-feet or deeper) to evaluate the effectiveness of a multi-beam bathymetric sonar.

R1: Although they are likely restricted to isolated points within the active channel, do not rule out the possibility of encountering holes to a depth of 30+ feet. Provision must be made for obtaining anomalous depths created by sporadic hydraulic conditions surrounding infrastructure such as diversion dams, bridge piers, and channel training structures, and geologic conditions, regardless of depth

For example, in the Park County portion of the Yellowstone River (upstream of the study area) scour holes have been encountered on the outside bank of bendways to a depth of 25 feet below water surface at low flow. This however, this is an area where the substrate is courser (cobble/gravel), the channel narrower, and the gradient is steeper than is typical in the channel mapping segments specified in the RFP. One quick way to get some sense of average depth (and thereby extent of extreme depth) is to look at aerial photos to get approx. channel width then integrate with USGS flow records to approximate the depth.

Q2: Can you provide aerial photos of the 130-mile reach to be surveyed?

R2: Color infrared digital orthophotography of the project areas may be downloaded from the following site -
<http://nris.state.mt.us/yellowstone/LowerYel/LowerYelPhotos.html>

Q3: It is unclear what the requirement is in the Scope of Project for methods to be used for bathymetric data acquisition. Section 3.2.6, Digital Channel Bathymetric Data (page 12), specifies the use of a “digital fathometer system” in depths greater than 18” and between 6” and 18”. We assume this is referring to the use of a single-beam echosounder. However, section 3.3.3.4 A refers to a multi-beam unit. Under the equipment requirements in Appendix D.4.3 (page 40), a multi-beam sonar with only a 90 degree swath width is specified and a single-beam echosounder is not listed. Is the intent to require the use of a multi-beam bathymetric sonar, a single-beam echosounder, both systems or can the contractor decide which will work best?

R3: The Contractor should determine and calibrate the system(s) they feel are best suited to the project. Critical items such as how the hydrologic gradient is handled should be addressed in the methods to be used.

Q4: In Appendix D.4.3 (page 40), why is a multibeam sonar system limited to a 90-degree swath width and frequency range between 400 and 500 kHz? We would suggest this be modified to include any multibeam bathymetric sonar that meets the accuracy requirements.

- R4: The system must be demonstrated as equal to or better than the specification as long as the system can acquire the data with sufficient accuracy and precision to support the 1/2-Meter DTM.
- Q5: Please clarify the equipment and methodology requirements for the two options listed under D.4.2 and D.4.3 (pages 39 and 40). The intent is not clear for the two options listed for the hydrographic survey methodology under D.4.2 (page 39). Under the 1st option the requirement is to obtain bathymetric data along cross-sections every 100 feet. We assume the intent is to accomplish this with a single-beam echosounder and not a multibeam sonar. Is that assumption correct? The second option is to run parallel profiles along the river channel and along each bank. Is the intent for the second option to require the use of a multibeam bathymetric sonar, if water depth is sufficient, or can this method be accomplished with a single-beam echosounder in shallow water? If a single-beam echosounder can be used in shallow water to run parallel profiles, is there a maximum distance requirement between lines?
- R5: Yes, a single beam echosounder would be used for the cross-section approach. The offeror must determine the proper density and pattern to define the channel area and meet the specifications. The intent is to run as many parallel profiles as the width of the river dictates, minimally a center profile, along with near shore runs where possible, coupled with additional profiles and/or cross sections as necessary.
- Q6: The RFP states twice that the Horizontal and Vertical Coordinates for the project are to be Metric. The RFP also states that the contours to be generated are two foot and four foot. Please clarify whether the H&V Coordinates are Metric or English.
- R6: The Horizontal and Vertical Coordinates and units are to be Metric.
- Q7: The RFP states in 3.3.3.3 F. that you want three sets of COLOR Mylar reproducible orthophotos products. In our experience Color Mylars are not a usual deliverable. Please clarify whether the Mylars are to be Color or Monochrome.
- R7: Hardcopy Mylar reproducible orthophotos will not be required. The only hardcopy submittals required will be color photo prints of the aerials and diapositives where required. Remaining mapping submittals (i.e. orthophotos, topographic maps, etc...) can be in digital form.
- Q8: Section 3.2.4 states a vertical accuracy requirement of 0.6 m accuracy_z for the bare earth LIDAR DTM data. Again, this requirement is restated in section B.8. However, in section B.9 there is a requirement for 95% of all points to be within 30 cm. This latter requirement is the same as 0.3 m accuracy_z. Again, in section B.13 there is an accuracy requirement for 95% of all points to be within 25 cm; the same as 0.25 m accuracy_z. We therefore have three different sets of accuracy requirements. What is the correct accuracy requirement for the LIDAR DTM data?

We understand that the overbank terrain data (LIDAR) needs to support 4-foot contours but we would like clarification on the accuracy requirement.

- R8: The overbank terrain data (LIDAR) needs to support 1-Meter (3.2808-foot) contours. The channel bathymetry needs to support 0.5-Meter (1.6404-foot) contours. The LIDAR accuracy requirements were derived from recommended guidelines from the American Society for Photogrammetry and Remote Sensing (ASPRS) released in February 2004. From equation [1] of that document the recommended RMSE(z) for 1-Meter contours would be 0.3 -Meter and the corresponding accuracy(z) would be 0.6-Meter. For more information see the following link:
http://www.asprs.org/asprs/society/committees/lidar/lidar_frame.html
- Q9: Section 3.2.4.1 states a requirement for a GPS kinematic survey for quality assurance of the LIDAR data. However, FEMA Guidelines and Specifications require for accuracy assessment under various land cover types. Only static survey techniques can be used in most land cover types such as high grass, forested areas, etc. Also, kinematic drive surveys may not be able to provide 5 cm vertical accuracy to 95% confidence as required in the RFP. Is the surveyor still required to perform kinematic surveys or can static surveys be used only?
- R9: The intent is to meet mapping specifications. An ordinate amount of data captured at or near the time of LiDAR data acquisition over the full array of land cover types is necessary to "ground truth" the LiDAR modeling process, as well as static GPS used for accuracy assessment. Both sets of data will be used during QA/QC review to "check" the data.
- Q10: Section 3.2.5 required color aerial photography to be collected for orthophoto production. Can digital mapping cameras be proposed for image data collection as a cost-saving alternative provided the final digital ortho imagery meets the required quality standards for accuracy and resolution?
- R10: The imagery platform must support photogrammetric data acquisition and softcopy or stereo superposition as part of the QA/QC for the LiDAR data processing. The aeriels will be needed for both production and data reduction of the LIDAR data sets.
- Q11: Can the bidder submit a proposal for only the aerial mapping (LIDAR and ortho data) or does the proposal need to be comprehensive and include the bathymetric mapping as well?
- R11: Proposals are expected to be comprehensive including aerial orthophotos, LIDAR survey data, bathymetric surveys, and merging and consolidation of all of the data into complete DTM's and topographic maps.

Q12: Section 3.3.3.5.A requires visible and invisible breaklines to be mapped. Does this imply the use of stereo photogrammetry? FEMA Appendix A allows 2D breaklines to be collected from digital orthophotography. Is this an acceptable method?

R12: Yes, this is acceptable as long as “inferred” break features are collected and used as form-lines. Again, the intent is to meet mapping specs; so if “2-D” breaks are used then there should be a corresponding increase in the density of LiDAR data insuring the accuracy and precision of the data in order to meet horizontal and vertical mapping specifications.

Q13: Can planimetric surface features as discussed in section 3.3.3.5.C be collected from digital orthophotography or do these features need to be collected from stereo pair aerial photography?

R13: It is preferred to collect the planimetric features from stereo pairs as use of the orthophotos may not meet horizontal accuracy requirements. The intent is to have photogrammetric support utilizing some type of stereo superposition to aid in data collection and processing, and QA/QC of LiDAR and other data.

Q14: The LIDAR system specifications in section B.1 discuss a LIDAR system that looks like a very low altitude, possibly helicopter-based or ground-based system. What specific system are these specifications from as they do not look like commercial standard LIDAR systems designed for fixed-wing aircraft?

R14: Any demonstrably equivalent system that can meet mapping requirements and be properly managed in conjunction with the proper photogrammetric environment is acceptable.

Q15: Section B.9 calls for National Map Accuracy Standards (NMAS) for Class I, 1”=200’ mapping. NMAS does not have a Class I. Do you mean ASPRS Class 1?

R15: Yes.

Q16: Section B.11 suggests a very low altitude, low speed, LIDAR data acquisition profile with an extremely wide scan angle. Normal LIDAR data acquisition profiles are for much high altitude, ground speed, and with narrower scan angles. Where did this collection strategy originate? Is the RFP suggesting a helicopter based LIDAR collection or sensor specific data collection?

R16: Any demonstrable LiDAR system is acceptable as long as it can meet specs, provide high enough point density, with enough accuracy and precision to meet mapping requirements with sufficient ground truthing and QA/QC procedures.

Q17: Section B.12 mentions LIDAR point density of one LIDAR return per square meter. What is the actual LIDAR point density requirement?

- R17: This can range from slightly sub-meter to above a meter, and is generally determined in combination with the type and accuracy/precision of the photogrammetric support. The demonstrable density/accuracy/precision combination that will meet mapping requirements is what is expected as part of the proposal.
- Q18: Section B.15 mentions possible build-up areas. What area of the project constitutes built-up area?
- R18: Urban areas in the project area, most notably the City of Billings, but several other small to medium sized communities exist within the project area also.
- Q19: Section B.20 mentions the use of 3 GPS base stations required with maximum base lengths of 30 km. Can an alternative approach, for example a single base station with 50 km base lines, be proposed that would lower survey costs as long as the final LIDAR map accuracy requirements are adhered to?
- R19: No. This type of support is required to meet specifications for topographic mapping at these accuracies and scales.
- Q20: Section E.4 calls for spot elevations. Since high-density LIDAR data collection is required, will stereo photogrammetric spot height data collection also be required can the LIDAR point elevation data suffice for this requirement?
- R20: Either will work. If the LiDAR happens to have a point that is at a maximum or minimum point it can be used, but generally a spot elevation is used to represent a high or low area that is not otherwise captured. This will be dependent on the approach taken for mapping.
- Q21: Was the use of multi-beam sonar and LIDAR a suggestion handed down by the Corps of Engineers, or was this a determination made by the Yellowstone River Conservation District Council? - General question regarding the project methodology.
- R21: The methodologies are not absolute requirements, but the proposal must present a demonstrable approach. LiDAR is generally cost effective if the specifications can be met, but a demonstrated conventional approach is acceptable.
- Q22: Are any estimates available on the percentage of river that is classified navigable (18+") versus that of shallow? To compound this question, is a significant length of the river going to be classified as shallow at the time when hydrographic surveys are likely to conviene (ie. late summer early fall months)? - Section 3.2.6 page 12 and Appendix D.4.1, page 39

R22: Estimates on the distribution of water depths will not be provided. Hydrographic surveys should be conducted during a time period that optimizes data collection and ultimate delivery of a map product that integrates channel and overbank contours.

Q23: Geographic location is not listed in the evaluation criteria in Section 6.0. Will this be considered if two equally qualified teams are identified? - Section 6.0, pages 27 & 28.

R23: No.

Q24: \$450K was identified as the project budget. If no contractor can meet this budget based on the requirements of this RFP, what course of action will be taken by District and Corps? - Section 5, page 25.

R24: The ability of the District to contract for this project depends upon the availability of funds to complete it. The District reserves the right to negotiate a revision to the scope of work to accomplish the purpose of the project or to not award a contract if it cannot be accomplished within the funding available.

Q25: Since the application of the gathered data will meet the input requirements of a spatially distributed hydraulic model, will the district be issuing a contract for hydraulic engineering services at a later date?-General question.

R25: The auspices under which any future contract(s) for hydraulic engineering services would be issued remains to be determined.

Q26: Section 3.2.8 Databases states: "Digital Topographic/Bathymetric databases that conform to SDSFIE standards will be delivered in Intergraph and ESRI compatible formats." Section 3.2.7, and elsewhere, states that data will be delivered in as .DTM and TIN (.E00) files. SDSFIE standards refer to ESRI GeoDatabase format while E00 files indicate a TIN/Coverage data format. These are not interchangeable. Should products be converted and delivered in all three formats (DTM, EOO and GeoDatabase)?

R26: The Geodatabase is not required, but the data format and classifications must be adhered to.

Q27: All online references to SDSFIE standards that we investigated resulted in dead links. Section F.1 refers to a specific SDSFIE web site, but does not give an address. Can you please provide this reference?

R27: <http://tsc.wes.army.mil/products/TSSDS%2DTSFMS/tssds/html/>

Q29: Section F.7 states that map files will be delivered in "ESRI Shape File/*.E00 data format". Shape files can not be exported to .E00. Is either format acceptable?

How does this relate to Section 3.2.8 (question 1 above) which infers that the data be in SDSFIE GeoDatabase format?

R29: Either ESRI Shape File or *.E00 format is acceptable. GeoDatabase is not required.

Q30: Page 7, Section 1.5.1 Organization of Proposals - The RFP states that "Offerers must organize their proposal into sections that follow the format of this RFP." Which sections of the RFP should be specifically addressed (i.e, Section 3 Scope of Projects, Appendices)?

R30: All sections of the RFP must be addressed as stated in 1.5.1. If the section, subsection, or appendix doesn't require a specific response from the offeror, a blanket statement as that shown in 1.5.1 may be used.

Q31: Page 18, Section 3.3.3.5 C. Planimetric Surface Features - Should the accuracy of the planimetric features be SDSFIE compliant?

R31: Yes.